



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,650	07/15/2003	Hiroshi Kondoh	240266US2	5255
22850	7590	05/12/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			TRAN, LONG K	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 05/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/618,650

Applicant(s)

KONDOH, HIROSHI



Examiner

Long K. Tran

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 April 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 - 7, 18 - 26 and 29 - 32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4 - 7, 18 - 26 and 29 - 32 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/10/03, 12/03/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restriction***

1. Applicant's election with traverse of **Species I**, claims **1 – 7, 18 – 26** and **29 – 32** on reply filed on April 18, 2005 is acknowledged. The traversal is on the ground(s) that "If the search and examination of an entire application can be made without serious burden, the Examiner must examine it on the merits, even though it includes claims to distinct or independent invention." This is not found persuasive because according to MPEP 802.01 that two embodiment appear to be independent as claimed Applicants have to elect only one of these embodiments. In addition, there is no evidence of record that the search and examination of an entire application including two distinct embodiments can be made without serious burden for Examiner.

The requirement is still deemed proper and is therefore made FINAL

### ***Priority***

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed on October 30, 2003.

### ***Information Disclosure Statement***

3. This office acknowledges of the following items from the Applicant:  
Information Disclosure Statements (IDS) filed on October 10, 2003 and December 03, 2003..

The references cited on the PTO -1449 form have been considered.

***Specification***

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims **1, 4, 5, 6, 7, 18, 21, 24, 29 and 30** are rejected under 35 U.S.C. 102(b) as being anticipated by Tsumura et al. (US Patent no. 5,500,537).

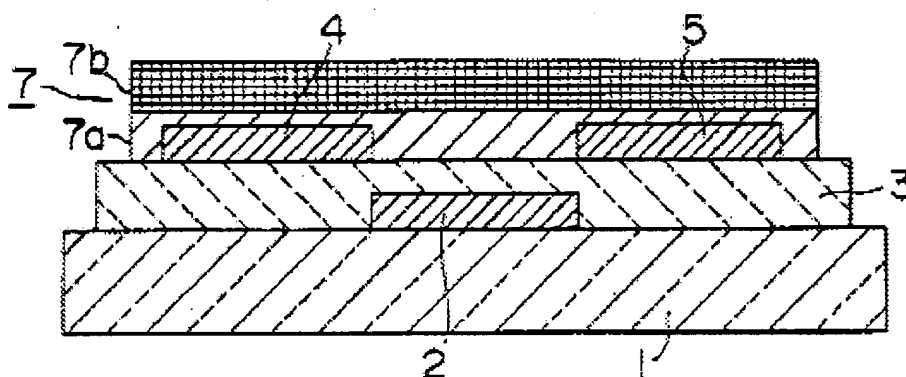
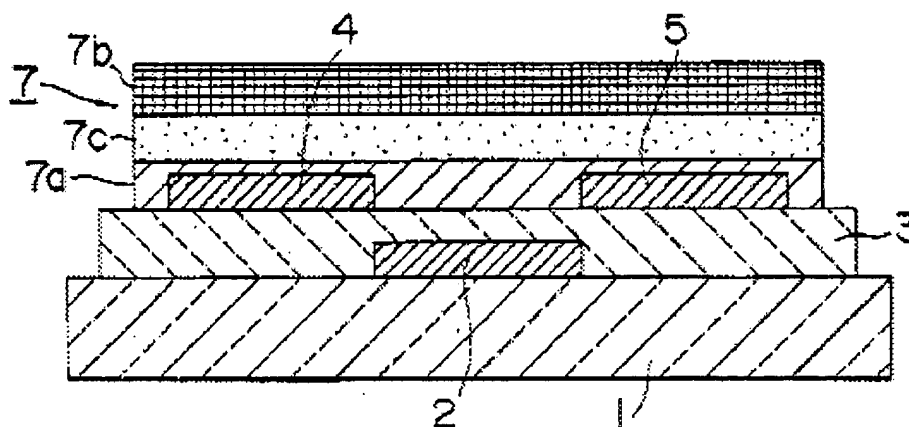
7. Regarding claim **1**, Tsumura discloses a semiconductor device, comprising: a gate electrode 2 (fig. 2);

an insulating layer 3 (fig. 2) on the gate electrode; a first electrode 4 (fig. 2) on the insulating layer; a second electrode 5 (fig. 2) on the insulating layer at an interval with the first electrode;

an organic semiconductor layer 7a (fig. 2; col. 6, lines 7 – 9) disposed in the interval between the first electrode and the second electrode and covering at least part of the first electrode and the second electrode; and

Art Unit: 2818

a first resistance layer 7b (fig. 2; col. 6, lines 7 – 9) formed on the organic semiconductor layer and having an electrical resistance lower than an electrical resistance of the organic semiconductor layer (col. 6, lines 18 – 21).

**FIG. 2****FIG. 3**

Regarding claim **4**, Kim discloses a second resistance layer 7c (fig. 3) formed at least at one of the position between the first resistance layer 7b (fig. 3) and the organic semiconductor layer 7a (fig. 3), wherein the second resistance layer has an electrical resistance so that carriers in the organic semiconductor layer are allowed to tunnel through the second resistance layer when a voltage of a predetermined value or more than the predetermined value is applied across the second resistance layer (col. 7, lines 24 – 35).

Regarding claim **5**, Tsumura discloses the first electrode, the second electrode and the first resistance layer is in contact with the organic semiconductor layer; and an interface between one of the first electrode, the second electrode and the first resistance layer rectifies an electrical current therethrough (col. 7, lines 16 – 29).

Regarding claim **6**, Tsumura discloses the resistance layer is formed to be a plate shape (figs. 2 & 3).

Regarding claim **7**, Tsumura discloses a substrate 1 (figs. 1 – 3) is beneath the gate electrode 2 (figs. 1 – 3).

Regarding claim **18**, Tsumura discloses the organic semiconductor layer is formed from polythiophene, poly (3-substituted thiophene, poly (3,4-bisubstituted thiophene, polybenzothiophene (col. 4, line 29 – 46).

Regarding claim **21**, Tsumura discloses each of the first electrode, the second electrode, and the gate electrode is formed from at least one of chromium (Cr), copper (Cu), aluminum (Al), molybdenum (Mo), gold (Au), palladium (Pd), platinum (Pt), silver (Ag) (col. 3, lines 22 – 33).

Regarding claim **22** Tsumura discloses the insulating layer is formed from at least one resin selected from the group consisting of organic thin film: polyimide, silicon dioxide, silicon nitride, or a metal oxide produced via oxidation of a surface of an electrode layer formed from the metal (aluminum oxide) (col. 3, lines 51 – 62).

Regarding claim **24**, Tsumura discloses the second resistance layer is formed polyester or polyimide (col. 6, line 67 and col. 7, lines 1 – 10).

8. Regarding claim **29**, Tsumura discloses a liquid crystal display device (col. 1, lines 23 – 24), comprising: a gate electrode 2 (fig. 2);

an insulating layer 3 (fig. 2) on the gate electrode; a first electrode 4 (fig. 2) on the insulating layer; a second electrode 5 (fig. 2) on the insulating layer at an interval with the first electrode;

an organic semiconductor layer 7a (fig. 2; col. 6, lines 7 – 9) disposed in the interval between the first electrode and the second electrode and covering at least part of the first electrode and the second electrode; and

a first resistance layer 7b (fig. 2; col. 6, lines 7 – 9) formed on the organic semiconductor layer and having an electrical resistance lower than an electrical resistance of the organic semiconductor layer (col. 6, lines 18 – 21).

9. Regarding claim **30**, Tsumura discloses a semiconductor device, comprising: a gate electrode 2 (fig. 2);

an insulating layer 3 (fig. 2) on the gate electrode; a first electrode 4 (fig. 2) on the insulating layer; a second electrode 5 (fig. 2) on the insulating layer at an interval with the first electrode;

an organic semiconductor layer 7a (fig. 2; col. 6, lines 7 – 9) disposed in the interval between the first electrode and the second electrode and covering at least part of the first electrode and the second electrode; and

a first resistance layer 7b (fig. 2; col. 6, lines 7 – 9) formed on the organic semiconductor layer and having an electrical resistance lower than an electrical resistance of the organic semiconductor layer (col. 6, lines 18 – 21).

In addition, the recitation that “a calculating device, comprising at least one of a NOT circuit, a NAND circuit, and a NOR circuit each including a plurality of semiconductor devices” has not been given patentable weight because it has been held that a preamble is denied the effect of limitation where the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. *Kropa V. Robie*, 88 USPQ 478 (CCPA 1951)..

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



Art Unit: 2818

11. Claims **2, 20, 23** and **25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsumura et al. (US Patent no. 5,500,537).

Regarding claim **2**, figure 2 illustrates both a distance from the first electrode to the first resistance layer and a distance from the second electrode to the first resistance layer appear to be shorter than the interval between the first electrode and the second electrode. Kim does not explicitly shows the values of the distances between the electrodes to the first resistance layer and the interval between the electrodes.

However, it would have been well known in the art that the selection of those parameters such as **energy, concentration, temperature, time, molar fraction, depth, width, thickness, etc.**, would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art.

"Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, width, thickness, etc., or in combination of the**

**parameters** would be an unpatentable modification. Under some circumstances,

however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges

and the applicant has the burden of proving such criticality.... More particularly, where

the general conditions of a claim are disclosed in the prior art, it is not inventive to

discover the optimum or workable ranges by routine experimentation." *In re Aller* 105

USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re*

*Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re*

Art Unit: 2818

*Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Moreover, the distances between the electrodes to the first resistance layer and the interval between the electrodes has not been alleged by applicant to be of significant importance for patentability.

Regarding claim **20**, Tsumura discloses the claimed invention of claim 1 except for the first resistance layer comprises at least one dopant with a low vapor pressure including one or more of poly(sulfonic acid), poly(styrenesulfonic acid), naphthalenesulfonic acid, and alkylnaphthalenesulfonic acid. However this limitation is taken to be a product by process limitation, it is the patentability product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324,326(CCPA 1974); *In re Marosi et al.*, 218 USPQ 289,292 (Fed. Cir. 1983); and particularly *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

Regarding claim **23**, Tsumura discloses the claimed invention of claim 1 except for the insulating layer is formed from at least a metal oxide film produced by coating and baking a solution obtained via hydrolysis of a metal alkoxide represented by one of the general formulas  $M(OR)_n$  and  $MR(OR')_{n-1}$ , wherein each of R and R' is an organic group such as an alkyl group and a phenyl group, M is a metal in one of IVA through VIIA groups, VIII group, and IB through VIB groups of the periodic table, and n is an ionic valence of the metal M. However this limitation is taken to be a product by process limitation, it is the patentability product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324,326(CCPA 1974); In re Marosi et al., 218 USPQ 289,292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process " claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

Regarding claim **25**, Tsumura discloses the claimed invention of claims 1 and 4 except for the second resistance layer is formed from at least a metal oxide film

Art Unit: 2818

produced by coating and baking a solution obtained via hydrolysis of a metal alkoxide represented by one of the general formulas  $M(OR)_n$  and  $MR(OR')_{n-1}$ , wherein each of R and R' is an organic group such as an alkyl group and a phenyl group, M is a metal in one of IVA through VIIA groups, VIII group, and IB through VIB groups of the periodic table, and n is an ionic valence of the metal M. However this limitation is taken to be a product by process limitation, it is the patentability product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324,326(CCPA 1974); *In re Marósi et al.*, 218 USPQ 289,292 (Fed. Cir. 1983); and particularly *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process steps, which must be determined in a “product by process” claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in “product by process” claim or not.

12. Claim **19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsumura et al. (US Patent no. 5,500,537) in view of Nishizawa et al. (US Patent no. 5,355,235).

Art Unit: 2818

13. Regarding claim **19**, Tsumura discloses the claimed invention of claim 1 except for the first resistance layer is formed from at least one electrically conductive material of polyacetylene-based electrically conductive polymers, polyphenylene-based electrically conductive polymers such as poly(para-phenylene) and derivatives thereof and poly(phenylene vinylene) and derivatives thereof, heterocyclic electrically conductive polymers such as polypyrrole and derivatives thereof, polythiophene and derivatives thereof, poly(ethylenedioxythiophene) and derivatives thereof, and polyfuran and derivatives thereof, ionic electrically conductive polymers such as polyaniline and derivatives thereof, and metals of chromium (Cr), tantalum (Ta), titanium (Ti), copper (Cu), aluminum (Al), molybdenum (Mo), tungsten (W), nickel (Ni), gold (Au), palladium (Pd), platinum (Pt), silver (Ag), and tin (Sn).

However, Nishizawa shows material for the first organic layer and second formed of polythiophene (col. 3, lines 65 – 68 and col. 4, line 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the first resistance layer (second organic layer) in Tsumura's device with polythiophene layer as shown by Nishizawa, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use.

14. Claim **26** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsumura et al. (US Patent no. 5,500,537) in view of Yang et al. (US Patent Application Publication no. 2002/013555).

Art Unit: 2818

15. Regarding claim **26**, Tsumura discloses the claimed invention of claim 1 except for a first power supply conducting a current between the first electrode and the second electrode; and a second power supply applying a voltage to the gate electrode.

However, it is conventional and also taught by Yang that transistor having a power supply to the gate of M7 (fig. 4) and a power supply connected to source (first electrode) and drain (second electrode).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a first power supply conducting a current between the first electrode and the second electrode; and a second power supply applying a voltage to the gate electrode in order to be able to program the device.

16. Claims **31** and **32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsumura et al. (US Patent no. 5,500,537) in view of Ong et al. (US Patent Application Publication no. 2003/0164495).

17. Regarding claims **31** and **32**, Tsumura discloses the claimed invention of claim one except for the organic semiconductor layer includes a dielectric material selected from styrene-based polymers such as copoly(styrene/butadiene), copoly(styrene/acrylonitrile), terpoly(styrene/acrylonitrile/butadiene), copoly(styrene/maleic acid), and copoly(styrene/acrylic acid), polyethylene-based resins such as copoly(ethylene/vinyl acetate), and chlorinated polyethylenes, polypropylene, vinyl chloride-based resins such as copoly(vinyl chloride/vinyl acetate), polyester alkyd resins, polyamides, polyurethanes, polycarbonates, polyallylates, polysulfones, diallyl

Art Unit: 2818

phthalate resin, poly(vinylbutyral) resin, polyether resins, polyester resins, acrylic resin, silicone resin, epoxy resins, phenolic resin, urea resin, melamine resin, fluorocarbon resins such as PFA, PTFE, and PVDF, Parylene resin, polyimide resins, and photo-setting resins such as epoxyacrylates and urethane acrylates, a metal oxide film produced by baking a solution obtained via hydrolysis of a metal alkoxide represented by one of the general formulas  $M(OR)_n$  and  $MR(OR')_{n-1}$ , in which each of R and R' is an organic group such as an alkyl group and a phenyl group, M is a metal in one of IVA through VIIA groups, VIII group, and IB through VIB groups of the periodic table, and n is an ionic valence of the metal M, an oxide of one of Al, Ta, and W, Si, and a nitride of Si.

However, Ong shows a gate dielectric layer (same as the organic layer 7a (figs. 2 and 3 of Tsumura)) "is comprised of silicon nitride, silicon oxide, insulating polymers of a polyester, a polycarbonate, a polyacrylate, a poly(methacrylate), a poly(vinyl phenol), a polystyrene, a polyimide, an epoxy resin, an inorganic-organic composite material of nanosized metal oxide particles dispersed in a polymer, a polyimide, or an epoxy resin" ([0015], page 3, mid-left column).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use materials for forming a gate dielectric layer shown by Ong to replace the organic layer in Tsumura's device, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use.

***Allowable Subject Matter***

5. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is an examiner's statement of reasons for the indication of allowable subject matter: Claim 3 is allowable over the prior art of record because none of the prior art whether taken singularly or in combination, especially when these limitations are considered within the specific combination claimed, to teach:

the first resistance layer 6 (fig. 6) being contacted with one of the first electrode 3 (fig. 6) and the second electrode.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long K. Tran whose telephone number is 571-272-1797. The examiner can normally be reached on Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2818

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Tran

UKT

May 5, 2005

  
David Neims  
Supervisory Patent Examiner  
Technology Center 2800